Human behaviour is a key determinant of the transmission of excreta-related diseases. The feasibility of changing certain behavioural patterns in order to optimize safety in the introduction of excreta or wastewater use schemes or to reduce disease transmission in existing schemes can be assessed only with a prior understanding of the cultural values attached to the social preferences that determine behaviour and practices. Cultural beliefs vary so widely in different parts of the world that it is not possible to assume that any of the practices that have evolved in relation to excreta and wastewater use in one place can be readily transferred elsewhere; a thorough assessment of the local sociocultural context is always necessary. There appears to have been a positive correlation, however, between the phenomenon of traditional “waste” use in societies and their population density. This is referred to as the “nutritional imperative.” Societies that use excreta or have used it in the recent past in agriculture or aquaculture are the most densely populated: Europe, India, China and South-east Asia (Edwards, 1992).

Culture varies, and social groups have their own norms and practices with respect to excretion, which will vary with age, gender, education, class, religion, marital status, employment and physical capacity (Tanner, 1995). Social change may put attitudes and norms under pressure, depending on what is considered modern or fashionable or what customs can be retained in new environments (Drangert, 2004b). They may also evolve as technology advances and governance structures and procedures are updated. Sociocultural aspects of excreta and greywater use in agriculture are outlined in the sections below.

7.1 Perceptions of excreta and greywater use
Human society has developed different sociocultural responses to the use of untreated excreta, ranging from abhorrence through disaffection and indifference to predilection. Most religions provide recommendations on how to manage excreta and have shaped people’s perceptions. Also, cultural, physical and social aspects condition the views of use.

In Africa, the Americas and Europe, use of fresh excreta is generally regarded with disaffection. However, conditioning makes caretakers perceive faeces of children and elderly as inoffensive, and the same applies to one’s own faeces. Products fertilized with raw excreta are regarded as tainted or defiled, but large agricultural areas in many countries are fertilized with raw sewage, and the products find consumers (see Volume 2 of the Guidelines). Negative views are less articulated in relation to excreta-derived compost or wastewater sludge commonly used in agriculture, horticulture and land reclamation schemes.

In contrast, fresh human excreta have been used in agriculture and aquaculture in Asian countries for thousands of years. This practice is in social accord with the Japanese and Chinese traditions of frugality and reflects an economic appreciation of soil fertility. This has evolved in response to the need to feed large populations with limited land availability, which makes it a necessity to use all fertilizing resources available. However, access to cheap chemical fertilizers has changed the practices in Japan (Ishikawa, 1998). The use of fresh excreta as fertilizer is often combined with the practice to always cook the food and avoid eating raw vegetables, thus reducing potential disease transmission.

In Islamic societies, direct contact with excreta is abhorred; according to Koranic edict, excreta are regarded as containing impurities (najassa). Excreta use is permitted only when the najassa have been removed (Faruqui, Biswas & Bino, 2001). Thus, the agricultural use of untreated excreta would not be tolerated, and any attempt to
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modify this view would be futile. On the other hand, excreta use after treatment would be acceptable if the treatment is such that the najassa are removed — for example, after thermophilic composting, which produces a humus-like substance that has no visual or odorous connection with the original material. Wastewater may be used for irrigation provided that the impurities (najassa) present in the raw wastewater are removed. Untreated wastewater is in fact used in some Islamic countries, principally in areas where there is an extreme water shortage, and then generally from a local wadi (ephemeral desert stream), but this is clearly a result of economic need and not of cultural preference.

In many countries, sanitation facilities that produce fresh excreta, such as bucket latrines, are being replaced by those that do not, such as pour flush toilets. This trend is actively promoted by many governments putting into place pour flush toilets, VIP toilets and urine-diverting toilets. The rationale is not only improved health, but also “society’s demand for doing away with the demeaning practice of human beings carrying nightsoil loads” (Venugopalan, 1984). From the viewpoint of excreta-related disease control, this should be welcomed, as the risks to health are substantially reduced. Perceptions about urine are rarely documented, but most people entertain a fairly relaxed attitude towards it. Urine has traditionally been used to smear wounds or as an insecticide to kill banana weevils in East Africa. In contrast to raw faeces, dried and composted faecal material has a distinctly different appearance, similar to ordinary soil, and is more acceptable. It is odourless and has a soil-brown colour that reminds people of soil conditioner. Cultural avoidance of handling well processed composted faecal material is little reported.

Use practices and perceptions of greywater have been little studied. Generally, the view of greywater disposal is relaxed, and little thought is devoted to its management. The interpretation is that the user has been in touch with it in the shower, sink or wash basin before it is discharged, and therefore it might be dirty but not harmful. Greywater contains only minor amounts of faecal excreta, unless diapers have been washed or anal cleansing is practised; it therefore differs from ordinary wastewater and is not regulated by religious edicts.

A common practice in areas with flush toilets where recurring interruptions in water supplies are frequent is the collection by residents of greywater from washing machines and showers to use it for flushing the toilet. In water-scarce areas, residents sometimes unplug greywater taps and use this for watering the garden in periods of restrictions. In parts of India, villagers may bring along the day’s greywater to the person who has milk cows as partial payment for the milk (H.C. Sharatchandra, personal communication).

Treated excreta and greywater are much less objectionable in appearance than untreated and from a socioaesthetic viewpoint are more suitable for agricultural use. Therefore, farmers, residents and utilities may take measures to treat or manage urine, faeces and greywater, or a mix of these.

Technical design may minimize contact with and smell or visible aspects of excreta and greywater. Design and technical development of on-site sanitation arrangements can make them odourless, unrecognizable and socioculturally acceptable. Greywater may be discharged in the yard in a mulch bed or subsoil irrigation pipe. Urine may be stored in a tank that is connected to a hose pipe for watering the garden. Faecal matter and toilet paper may be composted.

Generally, farmers seem to have a positive view of the fertilizing value of urine and faecal material, and they may select to use it on crops that are not sensitive to market reactions.
The management structure may have built-in incentives for residents and/or caretakers to fulfil supervision and operational maintenance. There is a need to strike a balance between concealing the system and giving incentives for proper use and sustainability. Use of excreta and greywater can be made safe and acceptable through a combination of technical and management arrangements. The purpose is to have a system that is simple to run well and, ideally, difficult to mismanage. It should be easy to follow the right procedure and difficult to perform the wrong one.

### 7.2 Food-related determinants

Perceptions of food are related to beliefs, culture, taboos and traditions and are increasingly influenced by mass communication. Food habits are formed under particular social and economic conditions. When adapted to other settings, they may be unsuitable or even harmful to health. For example, rural or indigenous peoples moving to urban areas or migrant workers, tourists or refugees living in foreign communities often maintain their food habits, although the conditions for food production, preparation or processing may be inappropriate or inadequate (WHO, 1995).

The sensory properties of a food item, the anticipated consequences of ingestion and knowledge of the nature or its origin all interact to influence food choice, but the hedonistic response — like or dislike — is the major determinant (WHO, 1995).

### 7.3 Behavioural change and cultural factors

The rapid growth and increased sophistication of consumer goods from detergents to pharmaceuticals make it increasingly difficult for people to know what they discharge after use. End-of-pipe treatment is not always capable of reducing pollution to acceptable levels and is often expensive. The European Commission is developing a procedure aimed at making manufacturers prove that their products are not harmful to humans or the environment (EU Reach Programme, 2005). This is different from the current administrative system, where the burden of proof of the opposite lies with authorities. To simplify treatment and improve the quality of the resources recovered, separate collection and treatment of different liquid and solid waste streams are commonly practised. In the case of sanitation systems, it generally requires a change in behaviour among the users. Where these changes have occurred, it has been a result of the users’ immediate needs and expectations. Attempts to minimize health risks by altering the established excreta use practices are likely to meet with social acceptance and success if the changes are minor and socially unimportant. Any attempts to alter a social preference are likely to fail.

Ingrained routine behaviour may be difficult to change. For instance, it may be hard to abandon the habit of disposing the wastewater of diaper laundry on the lawn if there is no feasible instant alternative for the person doing the washing. However, as is often the case, a simple technical improvement such as letting the water run into a mulch bed can help to solve the potential contamination problem.

Studies of alternative sanitation in housing areas show that residents may be willing to take on new responsibilities for environmental reasons. Among users, criteria such as privacy, convenience, cost and ease of construction or maintenance are, however, often considered more important in system selection than the protection of human health or the environment (Guzha & Musara, 2004; Holden, Terreblanche & Muller, 2004). The absence of flies and odour in correctly maintained urine diversion toilets and their permanent structures, allowing them to be built directly onto a house,
have proven to be important factors in their widespread use in areas of South Africa, where they are seen as a modern sanitation alternative (Drangert, 2004a).

Behavioural change regarding toilet use has occurred rapidly when local conditions have created an imperative for the recovery and use of excreta and/or greywater (Wirbelauer, Breslin & Guzha, 2003), such as a need for improved sanitation or for the products, such as fertilizer, soil conditioner or biogas. Physical conditions, such as high water table, regular flooding as well as rocky areas with high cost for digging trenches in the area, may prevent conventional sanitation solutions; instead, dry urine-diverting toilets may represent an affordable alternative to improve sanitation. For coastal estuaries as well as waterlogged areas occupied by the urban poor, technically sound and socially acceptable solutions may be found. In dry areas with poor soils, use of greywater and treated excreta may become a driving force for improved sanitation, since application will make urban agriculture possible, as has been demonstrated in West Africa.

Improved public health should always be combined with promoting better domestic and personal hygiene through education and behavioural change. In excreta use systems, the people most at risk are those who apply the excreta to the fields, their families, produce handlers, consumers of produce and people with access to the areas where excreta are used (Kochar, 1979). There is a whole range of behaviours that can be targeted to better protect public health.

Improving sanitation facilities and convincing people to use them properly are the first step. It is also important to demonstrate the public health benefits of adequately treating or storing excreta before its use as fertilizer. Information for residents and farmers has a better chance to be effective if it provides “facts” about what will happen if advice is followed and if they receive feedback on routine changes. The information provider should make sure that the focus is on effective measures to achieve the stated purpose and to do this “right thing” in the right way (efficiency).

Educational efforts can be directed at school children — for example, informing them about helminth infections, their life cycles and preventive measures against transmission. Encouraging workers to use protective gear (e.g. rubber boots and gloves) while harvesting or handling crops/products will reduce exposure to infectious agents, and improving hygienic practices (handwashing!) during produce handling, transport and produce preparation for consumption is very important. Communities should educate people about the risks associated with contact with untreated excreta. Direct work with farmers to restrict the types of produce grown in excreta-fertilized fields is advocated.

In many cases, it will be possible to tie efforts to achieve hygienic behavioural changes through education to ongoing agricultural extension and health outreach activities (Blumenthal et al., 2000). However, health interventions should focus on a few key specific behaviours to be successful and may work better if social and cultural reasons for changing hygienic practices are emphasized rather than motivation building on health benefits (Curtis & Kanki, 1998; Blumenthal et al., 2000). The acceptance of a change in sanitary practices is facilitated when users have been given the opportunity to examine and identify their own problems and are offered a wider choice of sanitation systems. “Seeing is believing” has also proved important in overcoming reservations concerning the use of certain systems, particularly when people have had the opportunity to visit them in the homes of neighbours or peers. The equipment and treatment used, the necessary maintenance and the recycled resources available and their form have to be both economically affordable and socially and culturally acceptable. This can best be achieved with the active participation of all relevant stakeholders in planning processes, as is conceived.
by the PHAST method (see section 11.2.1; WHO, UNDP & WSP, 1997; WHO, 2004a).

The willingness of communities and individuals to collect, treat and use greywater and excreta varies enormously from one country to another, and also within societies. Where poor farming households lack access to fertilizers, the use of excreta in agriculture is often well known and acceptable, but when civil servants working in cities are presented with the concept, these may have difficulty accepting it, often supported by their argument that the people who are expected to apply it would not accept it.

### 7.4 Convenience factors and dignity issues

Convenient use and operation have proven to be of crucial importance for users of sanitation facilities, including the level of comfort, privacy and security. The cost to construct and maintain installations is another important consideration. Many users who have changed to urine-diverting systems from pit or VIP latrines appreciate the level of comfort that, by their perception, is comparable with that of water toilets. When permanently installed in the house, they are more convenient for use day and night and provide security for women and girls who would otherwise be exposed to the risk of sexual harassment when visiting external toilet facilities. Permanent in-house structures receive a great deal of attention and have therefore become status symbols in some areas. They can also be adapted to accommodate different anal cleansing practices (Drangert, 2004a).

One of the greatest perceived inconveniences of these systems is the need for handling of faeces. During this activity, the exposure should be minimized. It has implications for the esteem that the community at large attributes to those engaged in it. In some parts of southern Africa, the practice of collecting and using someone else's excreta is looked upon unfavourably. However, an example from South Africa shows that with the right economic incentives, it may be acceptable (Drangert, 2006). In this case, a contractor collects the dry faeces and is paid by the residents for this service. The residents view him as a service provider. He, in turn, runs a successful company, recovering the nutrients and selling the treated product back to the residents.

The handling of excreta is closely linked to issues of human dignity. In some societies, those working with excreta or wastewater may be perceived as “unclean,” and the work is often a task reserved for those living on the margins of society in the weakest of social positions. One example of this can be seen among the Dhalits in India, although most states have outlawed the concept since the 1980s. One of the jobs assigned to them is the manual disposal of human excreta. For conventional sanitation systems, a similar handling of fresh, untreated faeces or wastewater may pose a risk to the health of workers in this area. This may involve emptying buckets or pits or unblocking sewage networks, frequently without appropriate protective clothing. Systems aimed at using on-site treatment approaches for excreta may reduce exposures to untreated faeces and create better conditions for those working in sanitation.

The privacy and convenience of the urine-diverting sanitation installations are often seen as protecting and promoting human dignity, by providing safe, private toilet facilities. Care should be taken in the design to ensure not only that they meet the needs of the majority of the adult population but also that sanitation facilities are accessible and usable for small children, the elderly and the disabled, and that their dignity is protected. In-house facilities can help to ensure that these goals are achieved.
7.5 Gender aspects on use of excreta and greywater

While men in most areas construct latrines, women are usually responsible for keeping them clean and usable. Women assist children, the aged and the sick with their hygiene and sanitation needs. Women also take responsibility for teaching children about the use of latrines and providing them with health/hygiene education. Women’s perceptions, needs and priorities in relation to sanitation are therefore quite different from men’s. Safety (particularly for children) and privacy appear to be the main concerns of women. What men want in relation to sanitation has never been specifically assessed. Men’s interests, needs and priorities in relation to sanitation may well be as neglected as women’s.

In parts of India, open defecation forces women and girls to enter the demarcated area for defecation outside the village. They are vulnerable to abuse or rape, particularly in the evening. Their choice is often to either use a “pottie” in the house or refrain until morning. Fathers are protective of the girls and prevent pre-marriage affairs, but this does not appear to be a compelling factor for installing a toilet in the house. There is no outspoken societal norm requesting men to do so, despite the fact that their daughter may be hurt. This highlights the need to translate the male task of constructing toilets into a non-negotiable social norm.

Another indication of deviation from male responsibility in East Africa (Drangert, 2004b) relates to the choice of locating the urine-diverting toilet inside the house or in the backyard. Male heads of households often opt to have the toilet in the yard, while female heads prefer that the toilet be indoors. This reflects the perceived benefits of the indoor toilet for women’s household chores, while men tend to undervalue female benefits and talk instead about the risk of a bad odour. Also, men generally have more options for excreting; they work outside the home more often and can use the facilities at the workplace or elsewhere. The gender perspectives on sanitation systems that intentionally recover and use excreta and greywater have not yet been specifically explored. Women are actively involved in food crop production and concerned about food security. They would be directly affected by increased access to soil nutrients provided by such systems. Access to a ready supply of fertilizer will help to increase food production and facilitate the development of small vegetable gardens and fruit trees close to homes.

Given women’s overall prime responsibility for the health and well-being of families in many areas, it may also be assumed that they would support such systems on the basis of health gains. Women’s support would also be critical for the success of different methods to treat faeces and ensure a sufficient reduction in pathogens. Since women have the responsibility for tending the cooking fires, their involvement could be used to ensure a supply of ashes to be used in the latrines. Men construct the latrine, and it may be assumed that they would appreciate not having to construct a new latrine and pit each time the old pit is filled. The possibility of simply emptying the toilet chamber and continuing to use it must be positive from a labour expenditure point of view. However, this task has to be done on a regular basis, which makes it different from typically male household tasks. Both women and men need access to cash incomes and would be assumed to welcome the potential economic benefits of excreta and greywater use, if the opportunities for small-scale entrepreneurship in construction of sanitation facilities and starting small market gardens are made available to both women and men. In India, the fertilizer value of a family’s excreta can pay for the investment in a urine diversion toilet within four years (Jönsson et al., 2005).
It has long been established that lack of access to adequate sanitation facilities, in particular from a privacy perspective, has implications for the education of girls. Parents are reluctant to send their girls to school in some parts of the world where school sanitation is inadequate. Experience from Tanzania in the 1980s revealed that parents sometimes took their girls out of primary school altogether because of poor sanitation facilities. In other cases, girls' schooling was irregular because inadequate facilities did not permit them to go to school during menstruation. Such systems can therefore contribute to the schooling of girls by providing access to appropriate and adequate sanitation.

Women retain most of the sanitary tasks for cleaning the latrine or toilet in the home. They are often involved in gardening and responsible for feeding the family. Therefore, the potential use of urine and greywater in fertilizing and watering the garden — be it a lawn, trees or vegetables — does not require a change of responsibilities between men and women in the household. By contributing to urban agriculture, treated excreta and greywater could help families save money by growing their own fruit and vegetables and/or selling some of the produce. Women often have a great need for increased sources of income but are often confined to the informal sector. Urban agriculture, as a means of ensuring greater food security and potential supplementary income, is particularly attractive to women, as it allows them to work close to their homes and facilitates the carrying out of other important roles, such as care of children, elderly and the sick. The importance of ensuring that women, as well as men, are involved in planning and decision-making on urban agriculture initiatives and have equitable access to training and extension services deserves special attention.

In areas with high water tables in South India, where other forms of sanitation are not feasible, sanitation systems that facilitate excreta and greywater use provide advantage for to women and girls. Without access to sanitation, the alternative for poor households is that all members of the households have to walk to open defecation sites (separate sites for women and men), sometimes at a distance of up to 0.5 km from the household. The health risks at the defecation sites are considerable. There are additional problems for women and girls, as they are able to use these sites to urinate and defecate only at dawn and dusk. The toilet in use in South India requires much less water than the more expensive alternative, the water flush toilets, which reduces the work burden for women in drawing and carrying water for the toilets.

Experience from Zimbabwe (Morgan, 2005) indicates that women in rural areas prefer the sanitation alternative offered by the arbour loos (an “arbour loo” is a simple form of latrine with a shallow pit, with a light, moveable slab. When the pit is three quarters full, a new pit is dug, and the slab and superstructure are moved to the new site. The old one is covered with topsoil, in which a fruit tree is planted) to the conventional pit latrines, as they can be built closer to the house. Women expressed appreciation of the gains in terms of privacy and safety, particularly for children, in night use. Women also consider the use of the filled pits for planting fruit trees beneficial. Having the fruit trees close to the house enhances the potential for tending them properly, particularly in terms of being able to use the greywater from bathing and dish washing for watering. Men expressed appreciation of the arbour loos because the pits are smaller than conventional pit latrines and building them requires less labour. These findings are, however, based not on well documented empirical data but on the observation of practitioners working in the communities.
When sanitation alternatives are being considered, it should be ensured that women are involved in all decision-making processes, even if traditionally they are excluded from decisions seen as being outside of the family, connected with the allocation of finances or concerned with "technical measures." It should be remembered that if these systems fail, women would usually be the group most severely affected.

Addressing gender issues implies taking a closer look at social structure and relationships between women and men and between girls and boys and examining the different roles of community members. Considering gender is therefore not just a matter of involving women in a sanitation project; the first goal is to make gender roles and interdependencies visible and to include this in the implementation process. The roles of men and women with regard to decision-making, choice of technology, hygiene, food security, financial security, crop production and health issues should be determined in order to involve the correct groups in an appropriate, participatory manner (Werner et al., 2003).